E/ECE/324
E/ECE/TRANS/505 } Rev.1/Add.40/Rev.1

30 May 1994

AGREEMENT

CONCERNING THE ADOPTION OF UNIFORM CONDITIONS OF APPROVAL AND RECIPROCAL RECOGNITION OF APPROVAL FOR MOTOR VEHICLE EQUIPMENT

done at Geneva on 20 March 1958

Addendum 40: Regulation No. 41

Revision 1

Incorporating:

Corrigendum 1 to the original text of the Regulation (English only) referred to in the Depositary Notification C.N.237.1980.TREATIES-18 of 15 September 1980
01 series of amendments - Date of entry into force: 24 July 1984
02 series of amendments - Date of entry into force: 1 April 1994

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF MOTOR CYCLES WITH REGARD TO NOISE

Regulation No. 41

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF MOTOR CYCLES WITH REGARD TO NOISE

CONTENTS

		Page
1.	SCOPE	4
2.	DEFINITIONS	4
3.	APPLICATION FOR APPROVAL	5
4.	MARKINGS	5
5.	APPROVAL	6
6.	SPECIFICATIONS	7
7.	MODIFICATIONS OF THE MOTOR CYCLE TYPE OR OF THE TYPE OF SILENCING SYSTEM	9
8.	CONFORMITY OF PRODUCTION	9
9.	PENALTIES FOR NON-CONFORMITY OF PRODUCTION	10
10.	PRODUCTION DEFINITELY DISCONTINUED	10
11.	NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS	10
12.	TRANSITIONAL PROVISIONS	10

ANNEXES

Annex 1 - Communication concerning the approval or extension or refusal or withdrawal of approval of production definitely discontinued of a motor cycle type with regard to noise emitted by motor cycles pursuant to Regulation No. 41

Annex 2 - Arrangements of approval marks

Annex 3 - Methods and instruments for measuring the noise made by motor cycles

Annex 4 - Maximum limits of sound level (new motor cycles)

Annex 5 - Exhaust system (silencer)

Regulation No. 41

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF MOTOR CYCLES WITH REGARD TO NOISE

1. SCOPE

This Regulation contains provisions relating to the noise made by two-wheeled motor cycles other than those having a maximum design speed not exceeding 50 km/h.

2. DEFINITIONS

For the purpose of this Regulation

2.1. "Approval of a motor cycle" means the approval of a motor cycle type with regard to noise;

2.2. "Motor cycle type" means a category of motor cycles which do not differ in such essential respects as:

2.2.1. the type of engine (two-stroke or four-stroke etc.; number and capacity of cylinders; number of carburettors; arrangement of valves; maximum horse-power and corresponding engine speed (r.p.m.) etc.);

2.2.2. number and ratios of gears; and

2.2.3. silencing systems;

2.3. "Silencing system" means a complete set of components necessary for limiting the noise made by a motor cycle and its exhaust;

2.4. "Silencing systems of different types" means silencing systems which differ in such essential respects as:

2.4.1. that their componerts bear different trade names or marks;

2.4.2. that the characteristics of the materials constituting a component are different or that the components differ in shape or size;

2.4.3. that the operating principles of at least one component are different;

2.4.4. that their components are assembled differently;\

2.5. "Silencing system component" 1/ means one of the individual

constituent parts whose assembly constitutes the silencing system.

3. APPLICATION FOR APPROVAL

3.1. The application for approval of a motor cycle type with regard to noise made by motor cycles shall be submitted by its manufacturer or by his duly accredited representative.

3.2. It shall be accompanied by the undermentioned documents in triplicate and the following particulars:

3.2.1. a description of the motor cycle type with regard to the items mentioned in paragraph 2.2. above. The numbers and/or symbols identifying the engine type and the motor cycle type shall be specified;

3.2.2. a list of the components, duly identified, constituting the silencing system;

3.2.3. a drawing of the assembled silencing system and an indication of its position on the motor cycle;

3.2.4. detailed drawings of each component to enable it to be easily located and identified, and a specification of the materials used.

3.3. At the request of the technical service responsible for conducting approval tests, the motor cycle manufacturer shall, in addition, submit a sample of the silencing system.

3.4. A motor cycle representative of the motor cycle type to be approved shall be submitted to the technical service responsible for conducting approval tests.

4. MARKINGS

4.1. The components of the silencing system shall bear:

1/ These components are, in particular, the exhaust manifold, the exhaust piping, the expansion chamber, the silencer proper etc. If the engine intake is equipped with an air filter and the filter's presence is essential to ensure observance of the prescribed sound-level limits, the filter must be regarded as a component of the "silencing system" and bear the marking prescribed in paragraphs 3.2.2. and 4.1.

4.1.1. the trade name or mark of the manufacturer of the silencing system and of its components;

4.1.2. the trade description given by the manufacturer; and

4.1.3. the approval mark and the ECE approval number according to Annex 2 of the Regulation. The approval number must correspond to the number of the ECE type approval certificate issued for the type of silencing system in question.

4.2. Such markings shall be clearly legible and be indelible.

5. APPROVAL

5.1. If the motor cycle type submitted for approval pursuant to this Regulation meets the requirements of paragraphs 6. and 7. below, approval of that motor cycle type shall be granted.

5.2. An approval number shall be assigned to each type approved. Its first two digits indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to the same motor cycle type equipped with another type of silencing system, or to another motor cycle type.

5.3. Notice of approval or of refusal of approval of a motor cycle type pursuant to this Regulation shall be communicated to the Parties to the Agreement which apply this Regulation, by means of a form conforming to the model in Annex 1 to this Regulation and of drawings of the silencing system, supplied by the applicant for approval in a format not exceeding A 4 (210 x 297 mm) or folded to that format and on an appropriate scale.

5.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every motor cycle conforming to a motor cycle type approved under this Regulation an international approval mark consisting of:

5.4.1. a circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval; 2/

5.4.2. the number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle prescribed in paragraph 5.4.1.

5.5. If the motor cycle conforms to a motor cycle type approved, under one or more other Regulations annexed to the Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 5.4.1. need not be repeated; in such a case the Regulation and approval numbers and the additional symbols of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 5.4.1.

5.6. The approval mark shall be clearly legible and be indelible.

5.7. The approval mark shall be placed close to or on the motor cycle data plate affixed by the manufacturer.

5.8. Annex 2 to this Regulation gives examples of arrangements of the approval mark.

6. SPECIFICATIONS

6.1. General specifications

6.1.1. The motor cycle, its engine and its silencing system shall be so designed, constructed and assembled as to enable the motor cycle, in normal use, despite the vibration to which it may be subjected, to comply with the provisions of this Regulation.

2/ 1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for the Czech Republic, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal, 22 for the Russian Federation, 23 for Greece, 24 (vacant), 25 for Croatia, 26 for Slovenia and 27 for Slovakia. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify the Agreement concerning the Adoption for Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, or in which they accede to that Agreement, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

6.1.2. The silencing system shall be so designed, constructed and assembled

as to be able to resist the corrosive action to which it is exposed.

6.1.3. The following information shall be provided on the motor cycle in an easily accessible but not necessarily immediately visible location:

(a) the manufacturer's name

(b) the value in dB(A) recorded during the stationary test required by paragraph 6.2.1.1.

(c) the engine speed at 3/4 S if S does not exceed 5000 min^{-1}, or at 1/2 S if S exceeds 5000 min^{-1}

(d) the number of ignition pulses per two engine revolutions for each cylinder.

6.2. Specifications regarding sound levels

6.2.1. Methods of measurement

6.2.1.1. The noise made by the motor cycle type submitted for approval shall be measured by the two methods described in Annex 3 to this Regulation for the motor cycle in motion and for the motor cycle when stationary. 3/

6.2.1.2. The two values measured in accordance with the provisions of paragraph 6.2.1.1. above shall be entered in the test report and on a form conforming to the model in Annex 1 to this Regulation.

6.2.1.3. The sound level measured by the method described in Annex 3, paragraph 3.1. to this Regulation when the motor cycle is in motion shall not exceed the limits prescribed (for new motor cycles and new silencing systems) in Annex 4 to this Regulation for the category to which the motor cycle belongs.

6.3. Additional specifications regarding silencing systems or components filled with fibrous material

6.3.1. If the motor cycle is fitted with a device designed to reduce the exhaust noise (silencer), the requirements of Annex 5 shall

---

3/ A test is made on a stationary motor cycle in order to provide a reference value for administrations which use this method to check motor cycles in use.

apply. If the inlet of the engine is fitted with an air filter

and/or an intake-noise absorber which is (are) necessary in order to ensure compliance with the permissible sound level, the filter and/or absorber shall be considered to be part of the silencer, and the requirements of Annex 5 shall also apply to them.

6.3.2. A diagram of the exhaust system shall be appended to the certificate referred to in Annex 1.

6.3.3. The silencer must be marked with a clearly legible and indelible reference to its make and type.

7. MODIFICATIONS OF THE MOTOR CYCLE TYPE OR OF THE TYPE OF SILENCING SYSTEM

7.1. Every modification of the motor cycle type or of the silencing system shall be notified to the administrative department which approved the motor cycle type. The said department may then either:

7.1.1. consider that the modifications made are unlikely to have appreciable adverse effects, and that in any case the motor cycle still complies with the requirements; or

7.1.2. require a further test report from the technical service responsible for conducting the tests.

7.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 5.3. above to the Parties to the Agreement which apply this Regulation.

8. CONFORMITY OF PRODUCTION

8.1. Every motor cycle bearing an approval mark as prescribed under this Regulation shall conform to the motor cycle type approved, be fitted with the silencing system with which it was approved and satisfy the requirements of paragraph 6. above.

8.2. In order to verify conformity as prescribed in paragraph 8.1. above, a motor cycle, bearing the approval mark required by this Regulation, shall be taken from the series. Production shall be deemed to conform to the requirements of this Regulation if the level measured by the method described in Annex 3, paragraph 3.1. does not exceed by more than 3 dB(A) the value measured during type approval or by more than 1 dB(A) the limits prescribed in Annex 4 to this Regulation.

9. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

9.1. The approval granted in respect of a motor cycle type pursuant to

this Regulation may be withdrawn if the requirements laid down in paragraph 8.1. above are not complied with, or if the motor cycle has failed to pass the tests provided for in paragraph 8.2. above.

9.2. If a Party to the Agreement which applies this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

10. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a type of a motor cycle approved in accordance with this Regulation, he shall inform the authority which granted the approval. Upon receiving the relevant communication, that authority shall inform thereof the other Parties to the Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

11. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS

The Parties to the 1958 Agreement applying this Regulation shall communicate to the United Nations Secretariat the names and addresses of the technical services responsible for conducting approval tests and of the administrative departments which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval, issued in other countries, are to be sent.

12. TRANSITIONAL PROVISIONS

12.1. As from the date of entry into force (1 April 1994) of the 02 series of amendments to this Regulation, no Contracting Party applying it shall refuse to grant approvals under this Regulation as amended by the 02 series of amendments.

12.2. The dates of enforcement depend on the category of motor cycle and its sound level limit not to be exceeded. The sound level limits and the corresponding dates are shown in the table in paragraph 12.3.

12.3. As from the dates of enforcement mentioned in the table below, Contracting Parties applying this Regulation may refuse first national registration (first entry into service) of a vehicle which does not meet the requirements of the 02 series of amendments to this Regulation.

Category of motor cycle	Engine cylinder capacity (cc)	Values expressed in dB(A)	Dates of enforcement
First category	cc ≤ 80 cm^3	75	1 October 1995
Second category	80 cm^3 < cc ≤ 175 cm^3	77	31 December 1996
Third category	cc > 175 cm^3	80	1 October 1995

Annex 1

COMMUNICATION

(Maximum format: A4 (210 x 297 mm))

issued by: Name of administration:
.....
.....
.....

concerning: 2/ APPROVAL GRANTED
APPROVAL EXTENDED
APPROVAL REFUSED
APPROVAL WITHDRAWN
PRODUCTION DEFINITELY DISCONTINUED
of a motor cycle type with regard to noise emitted by motor cycles pursuant to Regulation No. 41

Approval No. ..... Extension No. .....

---

1. Trade name or mark of the motor cycle .....
2. Motor cycle type .....
3. Manufacturer's name and address .....
4. If applicable, name and address of manufacturer's representative
.....
.....
5. Kind of engine 3/ .....
6. Cycles: two-stroke or four-stroke (if applicable) .....
7. Cylinder capacity .....
8. Engine power (state how measured) .....
9. Speed at which maximum power is developed (rpm) .....
10. Number of gears .....
11. Gears used .....
12. Final drive ratio(s) .....

13. Type and dimensions of tyres .....

14. Maximum permissible gross weight .....
15. Brief description of the silencing system .....
.....
16. Load conditions of motor cycle during test .....
17. For stationary motor cycle test: location and orientation of the microphone (by reference to diagrams in Appendix to Annex 3) .....
.....
18. Sound levels:
Motor cycle in motion .....dB(A) at steady speed before acceleration of ....km/h, rotation speed of the engine ....rpm.
Motor cycle stationary .....dB(A) with engine running at ..... rpm.
19. Deviations in calibration of sound level meter .....
20. Motor cycle submitted for approval on .....
21. Technical service responsible for conducting approval tests .....
.....
22. Date of report issued by that service .....
23. Number of report issued by that service .....
24. Approval granted/extended/refused/withdrawn 2/ .....
25. Position of approval mark on the motor cycle .....
26. Place .....
27. Date .....
28. Signature .....
29. The following documents, bearing the approval number shown above, are annexed to this communication:
... drawings, diagrams and plans of the engine and of the noise reduction system;
... photographs of the engine and of the silencing system;
... list of components, duly identified constituting the noise reduction system.

1/ Distinguishing number of the country which has

granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).

2/ Strike out what does not apply.

3/ If a non-conventional engine is used, this should be stated.

Annex 2

ARRANGEMENTS OF APPROVAL MARKS

Model A

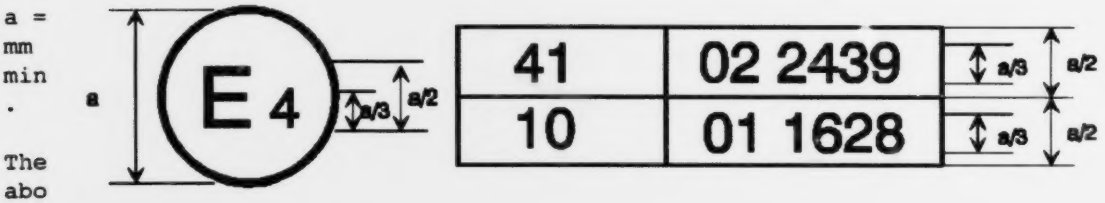
(See paragraph 5.4. of this Regulation)

a = 8 mm min.

The above approval mark affixed to a motor cycle shows that the motor cycle type concerned has, with regard to noise, been approved in the Netherlands (E 4) pursuant to Regulation No. 41 under approval number 022439. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No. 41 as amended by the 02 series of amendments.

Model B

(See paragraph 5.5 of this Regulation)



The above approval mark affixed to a motor cycle shows that the motor cycle type concerned has been approved in the Netherlands (E 4) pursuant to Regulations Nos. 41 and 10. */ The first two digits of the approval numbers indicate that on the date on which these approvals were granted, Regulation No. 41 included 02 series of amendments and Regulation No. 10 included the 01 series of amendments.

---

*/ The second number is given merely as an example.

Annex 3

METHODS AND INSTRUMENTS FOR MEASURING THE NOISE MADE BY MOTOR CYCLES

1. MEASURING INSTRUMENTS

1.1. A sound level meter of high precision complying at least with the specifications of the Publication No. 179 (1965) "Precision sound level meters" of the International Electrotechnical Commission (IEC) concerning the characteristics of sound level meters shall be used. Measurement shall be carried out with a weighting network and a time constant conforming to curve A and the "fast response" time.

1.2. The sound level meter shall be calibrated against a standard noise source immediately before and after each series of test runs. If the meter reading obtained from either of these calibrations deviates by more than 1 dB from the corresponding reading taken at the time of the last free-field calibration (i.e. the annual calibration) the test shall be considered invalid. The actual deviation shall be stated in the approval document (Annex 1, item 19).

1.3. The rotational speed of the engine and the speed of the motor cycle through the test area shall be measured by independent measuring devices whose accuracy is within 3 per cent of the actual speed.

2. CONDITIONS OF MEASUREMENT

2.1. Site

2.1.1. The measurements shall be made at an open site where the ambient and wind noise levels are at least 10 dB(A) below the noise level being measured. The above-mentioned area may take the form of an open space of 50 m radius having a central part of at least 10 m radius, practically level, consisting of concrete, asphalt or similar material and not covered with powdery snow, tall grass, loose soil, ashes or the like. During the test nobody shall stand in the measurement area, except the observer and the driver, whose presence must have no influence on the meter reading.

2.1.2. The surface of the test track used to measure the noise of motor cycles in motion shall be such as not to cause excessive tyre noise.

2.1.3. Measurements shall not be made under adverse weather conditions. Any sound peak which appears to be unrelated to the characteristics of the general sound level of the motor cycle shall be ignored in taking

the readings. If a wind-guard is used, its influence on the sensitivity and the directional characteristics of the microphone shall be taken into account.

2.2. Vehicle

2.2.1. Measurements shall be made on motor cycles with driver only.

2.2.2. The tyres of the motor cycle shall be of the correct size and shall be inflated to the prescribed pressure(s) for the motor cycle in its unladen condition.

2.2.3. Before the measurements are started, the engine shall be brought to its normal operating conditions as regards:

2.2.3.1. temperatures

2.2.3.2. tuning

2.2.3.3. fuel

2.2.3.4. sparking plugs, carburettor(s), etc. (as appropriate).

2.2.4. If the motor cycle is equipped with devices which are not necessary for its propulsion, but which are used whilst the motor cycle is in normal service on the road, those devices shall be in operation in accordance with the specifications of the manufacturer. Where a motor cycle is fitted with a side-car, this shall be removed for the purpose of the test.

3. METHODS OF TESTING

3.1. Measurement of noise of motor cycles in motion

3.1.1. General conditions of test

3.1.1.1. At least two measurements shall be made on each side of the motor cycle. Preliminary measurements may be made for adjustment purposes, but shall be disregarded.

3.1.1.2. The microphone shall be situated 1.2 m ± 0.1 m above ground level at a distance of 7.5 m ± 0.2 m from the path of the motor cycle's centre line, measured along the perpendicular (PP') to that line (see Appendix, Figure 1).

3.1.1.3. Two lines, AA' and BB', parallel to line PP' and situated

respectively 10 m forward and 10 m rearward of that line shall be marked out on the test runway. For all measurements the motor cycle shall be driven in a straight line over the acceleration section in such a way that the longitudinal median plane of the motor cycle is as close as possible to line CC'. The motor cycle shall approach line AA' at a steady speed as specified below. When the front of the motor cycle reaches the line AA', the throttle shall be fully opened as rapidly as practicable and held in the fully-opened position until the rear of the motor cycle crosses the line BB'; the throttle shall then be closed again as rapidly as possible.

3.1.1.4. The maximum value recorded at each measurement shall constitute the result of the measurement. The measurements shall be considered valid if the difference between the two consecutive measurements on the same side of the vehicle is not more than 2 dB(A).

3.1.2. Determination of the approach speed

3.1.2.1. Symbols used

The letter symbols used in this paragraph have the following meaning:

S : engine rotation speed as indicated under item 9 of Annex 1

N_A: uniform engine rotational speed at the approach of line AA'

V_A: uniform vehicle speed at the approach of line AA'.

3.1.2.2. Motor cycle with a manually-operated gear-box

3.1.2.2.1. Approach speed

The uniform speed of the motor cycle at the approach line AA' shall be such that

either: $N_A = 3/4\ S$ and $V_A \leq 50$ km/h

or: $V_A = 50$ km/h

3.1.2.2.2. Choice of gear ratio

3.1.2.2.2.1. Motor cycles, whatever the engine cylinder capacity (cc), when fitted with a gearbox having not more than four gears, shall be tested in second gear (provided that the requirements of paragraph 3.1.2.2.2.4. of this Annex are complied with).

3.1.2.2.2.2. Motor cycles fitted with an engine having a cylinder capacity not exceeding 175 cm^3 and a gearbox with five or more gears shall be submitted to one test only, in third gear.

3.1.2.2.2.3. Motor cycles fitted with an engine having a cylinder capacity exceeding 175 cm^3 and a gearbox with five or more gears, shall be submitted to a test in second gear and a test in third gear; the average value of the two tests (provided that the requirements of paragraph 3.1.2.2.2.4. of this Annex are complied with) shall be taken as the test result.

3.1.2.2.2.4. If during the test carried out in second gear, the stabilized engine speed at the line marking the end of the test track (N_B) exceeds 110 per cent of S (S being the engine speed corresponding to the speed at which the engine develops its maximum power), the test shall be carried out in third gear and the noise level measured in that gear only shall be taken as the test result.

3.1.2.3. Automatic transmission motor cycle

3.1.2.3.1. Motor cycles without a manual selector

3.1.2.3.1.1. Approach speed

The motor cycle shall approach the line AA' at various uniform speeds of 30, 40, 50 km/h or at 3/4 of the maximum on-road speed if this value is lower. The condition giving the highest noise level shall be selected.

3.1.2.3.2. Motor cycles equipped with a manual selector with X positions for forward drive

3.1.2.3.2.1. Approach speed

The motor cycle shall approach the line AA' at a uniform speed corresponding to

either $N_A = 3/4\ S$ and $V_A \leq 50$ km/h

or $V_A = 50$ km/h and $N_A < 3/4\ S$.

Nevertheless, if there is a down-shift to first gear during the test, the motor cycle speed ($V_A = 50$ km/h) can be increased up to a maximum of 60 km/h in order to avoid the down-shift.

3.1.2.3.2.2. Position of the manual selector

If a manual selector with X forward positions is fitted to the motor cycle, the test shall be performed with the selector in the highest position; external down-shifting (for example, kick-down) shall be excluded. If an automatic down-shift occurs after the line AA', the test will be repeated using the position highest-1 and highest-2 as necessary, until the selector is placed in the highest position allowing the test to be performed without automatic down-shift (without using kick-down).

3.2. Measurement of noise emitted by stationary motor cycles

3.2.1. Test site - local conditions (see Appendix, Figure 2)

3.2.1.1. Measurements should be made on a stationary motor cycle in an area which does not present a great deal of disturbance to the sound field.

3.2.1.2. Every open space will be considered as a suitable test site which consists of a flat area made of concrete, asphalt or hard material having a high reflective capacity, excluding compressed or other earth surfaces, in which one can trace a rectangle whose sides are at least three metres from the extremities of the motor cycle, inside which there is no noticeable obstacle and, in particular, the motor cycle shall not be positioned at a distance less than 1 m from a pavement edge when the exhaust noise is measured.

3.2.1.3. During the test nobody shall stand in the measurement area, except the observer and the driver, whose presence must have no influence on the meter reading.

3.2.2. Disturbance noise and wind interference

The ambient noise levels at each measuring point shall be at least 10 dB(A) below the levels measured during the tests in the same points.

3.2.3. Measuring method

3.2.3.1. Number of measurements

At least three measurements shall be carried out at each measuring point. The measurements should only be considered as valid if the difference between the recordings of three measurements made immediately one after the other is not greater than 2 dB(A). The highest value given by these three measurements will constitute the result.

3.2.3.2. Positioning and preparation of the motor cycle

The motor cycle shall be located in the centre part of the test area with the gear lever in neutral position and the clutch engaged. If the design of the motor cycle does not allow this, the motor cycle shall be tested in conformity with the manufacturer's prescriptions for stationary engine testing. Before each series of measurements, the engine must be brought to its normal operating condition, as specified by the manufacturer.

3.2.3.3. Measuring of noise in proximity to the exhaust (see Appendix, Figure 2)

3.2.3.3.1. Positions of the microphone

3.2.3.3.1.1. The height of the microphone above the ground should be equal to that of the outlet pipe of the exhaust gases, but in any event shall be limited to a minimum value of 0.2 m.

3.2.3.3.1.2. The microphone must be pointed towards the orifice of the gas flow and located at a distance of 0.5 m from the latter.

3.2.3.3.1.3. Its axis of maximum sensitivity must be parallel to the ground and must make an angle of 45° ± 10° with the vertical plane containing the direction of the gas flow. The instructions of the manufacturer of the sound level meter with regard to this axis must be respected. In relation to this plane, the microphone shall be placed in such a way as to obtain the maximum distance from the longitudinal median plane of the motor cycle; in case of doubt, the position which gives the maximum distance from the contour of the motor cycle shall be selected.

Annex 3 - Appendix

MEASURING POSITIONS FOR MOTOR CYCLES IN MOTION

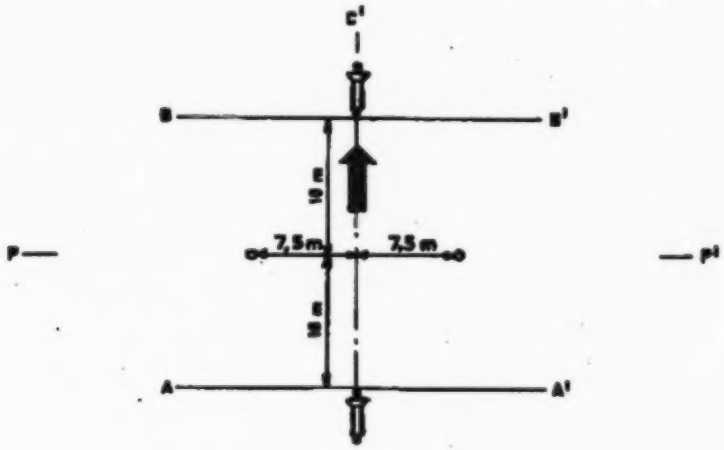


Figure 1

Measuring positions for stationary motor cycles
Height of exhaust pipe-centre-line

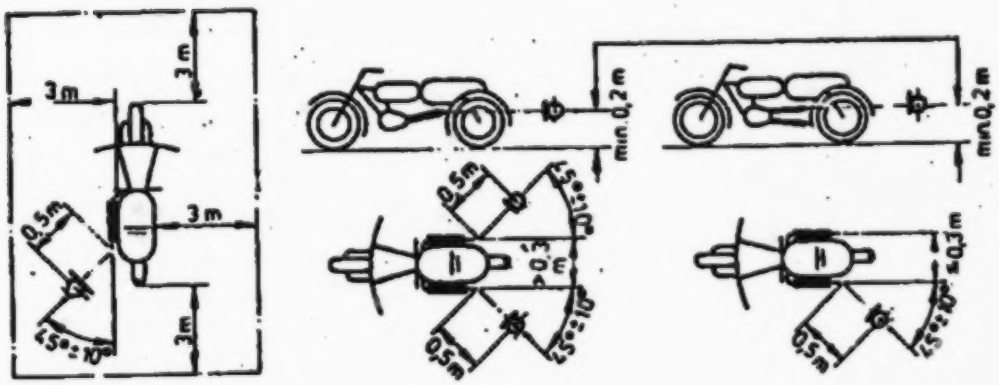


Figure 2

3.2.3.3.1.4. In the case of an exhaust provided with two or more outlets spaced less than 0.3 m apart, only one measurement is made; the microphone position is related to the outlet nearest to the external side of the motor cycle or, when such an outlet does not exist, to the outlet which is the highest above the ground.

3.2.3.3.1.5. For motor cycles having an exhaust provided with outlets spaced more than 0.3 m apart, one measurement is made for each outlet as if it were the only one, and the highest level is noted.

3.2.3.3.2. Operating conditions of the engine

3.2.3.3.2.1. The engine speed shall be held steady at one of the following values:

3/4 S if S does not exceed 5,000 min^{-1}

1/2 S if S exceeds 5,000 min^{-1}.

3.2.3.3.2.2. When constant engine speed is reached, the throttle shall be returned swiftly to the idle position. The sound level shall be measured during a period of operation consisting of a brief maintenance of constant engine speed and throughout the deceleration period, the maximum deflection of the needle being taken as the test value.

4. INTERPRETATION OF RESULTS

4.1. The figure recorded shall be that corresponding to the highest sound level. Should that figure exceed by more than 1 dB(A) the maximum sound level authorized for the category of motor cycle tested, a second series of two measurements shall be made. Three out of the four results so obtained must fall within the prescribed limits.

4.2. To allow for lack of precision in the measuring instrument the figures read from it during measurement shall each be reduced by 1 dB(A).

4.3. When conducting the stationary test for the purpose of controlling motor cycles in use, to allow for any distortions because of the test site, conditions or instrumentation, the test readings shall be reduced by 5 dB(A).

Annex 4

MAXIMUM LIMITS OF SOUND LEVEL (NEW MOTOR CYCLES)

Class of motor cycle	Engine cylinder capacity (cc)	Values expressed in dB(A)
Class I	cc ≤ 80 cm^3	75
Class II	80 cm^3 < cc ≤ 175 cm^3	77
Class III	cc > 175 cm^3	80

Annex 5

EXHAUST SYSTEM (SILENCER)

1. Fibrous absorbent material must be asbestos-free and may be used in the construction of silencers only if suitable devices ensure that the fibrous material is kept in place for the whole time that the silencer is being used and it meets the requirements of any one of paragraphs 1.1., 1.2. and 1.3.

1.1. After removal of the fibrous material, the sound level must comply with the requirements of Annex 3 and the sound level limits of Annex 4.

1.2. The fibrous absorbent material may not be placed in those parts of the silencer through which the exhaust gases pass and must comply with the following requirements:

1.2.1. The material must be heated at a temperature of 650 ± 5°C for four hours in a furnace without reduction in every length, diameter or bulk density of the fibre.

1.2.2. After heating at 650 ± 5°C for one hour in a furnace, at least 98 per cent of the material must be retained in a sieve of nominal aperture size 250 μm complying with

ISO Standard 3310/1 : 1990 when tested in accordance with ISO Standard 2599 : 1983.

1.2.3. The loss in weight of the material must not exceed 10.5 per cent after soaking for 24 hours at 90 ± 5°C in a synthetic condensate of the following composition:

1 N hydrobromic acid (HBr): 10 ml
1 N sulphuric acid (H_2SO_4): 10 ml
Distilled water to make up to 1,000 ml.

Note: The material must be washed in distilled water and dried for one hour at 105°C before weighing.

1.3. Before the system is tested in accordance with Annex 3, it must be put into a normal state for road use by one of the following condition methods:

1.3.1. CONDITIONING BY CONTINUOUS ROAD OPERATION

1.3.1.1. According to the classes of motor cycles, the minimum distances to be completed during conditioning are:

Class of motor cycle according to cylinder capacity in cm^3	Distance (km)
Class I ≤ 80	4,000
Class II > 80 ≤ 175	6,000
Class III > 175	8,000

1.3.1.2. 50 ± 10 per cent of this conditioning cycle consists of town driving and the remainder of long-distance runs at high speed; the continuous road cycle may be replaced by a corresponding test-track programme.

1.3.1.3. The two speed regimes must be alternated at least six times.

1.3.1.4. The complete test programme must include a minimum of 10 breaks of at least three hours' duration in order to reproduce the effects of cooling and condensation.

1.3.2. CONDITIONING BY PULSATION

1.3.2.1. The exhaust system or components thereof must be fitted to the motor cycle or to the engine. In the former case, the motor cycle must be mounted on a test bench.

The test apparatus, a detailed diagram of which is shown in Figure 1, is fitted at the outlet of the exhaust system. Any other apparatus providing equivalent results is acceptable.

1.3.2.2. The test equipment must be adjusted so that the flow of exhaust gases is alternatively interrupted and restored 2,500 times by a rapid-action valve.

1.3.2.3. The valve must open when the exhaust gas back-pressure, measured at least 100 mm downstream of the intake flange, reaches a value of between 0.35 and 0.40 bar. Should such a figure be unattainable because of the engine characteristics, the valve must open when the gas back-pressure reaches a level equivalent to 90 per cent of the maximum that can be measured before the engine stops. It must close when this pressure does not differ by more than 10 per cent from its stabilized value with the valve open.

1.3.2.4. The time-delay switch must be set for the duration of exhaust gases calculated on the basis of the requirements of paragraph 1.3.2.3.

1.3.2.5. Engine speed must be 75 per cent of the speed (S) at which the engine develops maximum power.

1.3.2.6. The power indicated by the dynamometer must be 50 per cent of the full-throttle power measured at 75 per cent of engine speed (S).

1.3.2.7. Any drainage holes must be closed off during the test.

1.3.2.8. The entire test must be complete within 48 hours. If necessary, a cooling period must be allowed after each hour.

1.3.3. CONDITIONING ON A TEST BENCH

1.3.3.1. The exhaust system must be fitted to an engine representative of the type fitted to the motor cycle for which the exhaust system was designed, and mounted on a test bench.

1.3.3.2. Conditioning consists of the specific number of test bench cycles for each class of motor cycle for which the exhaust system was designed. The number of cycles for each class of motor cycle is:

Class of motor cycle according to cylinder capacity in cm^3	Number of cycles
Class I $\leq$ 80	6
Class II > 80 $\leq$ 175	9
Class III > 175	12

1.3.3.3. Each test-bench cycle must be followed by a break of at least six hours in order to reproduce the effects of cooling and condensation.

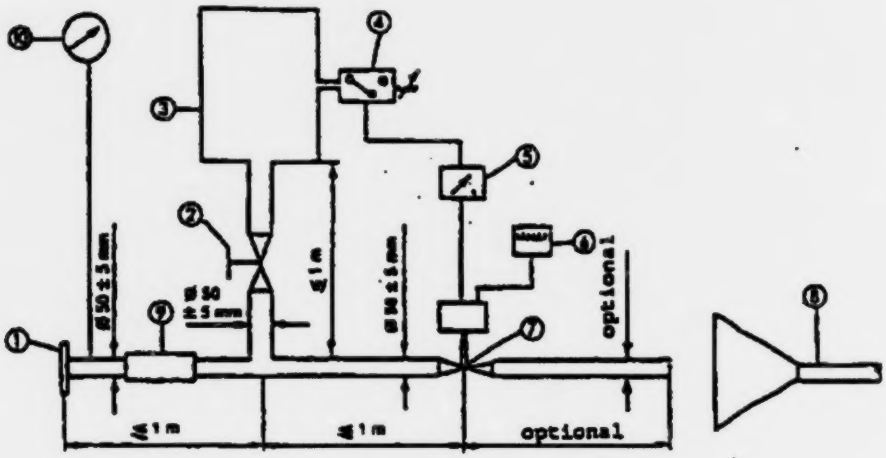
1.3.3.4. Each test-bench cycle consists of six phases. The engine conditions for and the duration of each phase are:

Phase	Conditions	Duration of phase	
		Engines ≤ 175 cm^3	Engines > 175 cm^3
		(minutes)	(minutes)
1	Idling	6	6
2	25 % load at 75 % S	40	50
3	50 % load at 75 % S	40	50
4	100 % load at 75 % S	30	10
5	50 % load at 100 % S	12	12
6	25 % load at 100 % S	22	22
	Total time	2.5 hours	2.5 hours

1.3.3.5. During this conditioning procedure, at the request of the manufacturer, the engine and the silencer may be cooled in order that the temperature recorded at a point not more than 100 mm from the exhaust gas outlet does not exceed that measured when the motor cycle is running at 110 km/h or 75 per cent S in top gear. The engine and/or motor cycle speeds are determined to within ± 3 per cent.

Figure 1

TEST APPARATUS FOR CONDITIONING BY PULSATION



1. Inlet flange or sleeve for connection to the rear of the test exhaust system.

2. Hand-operated regulating valve.

3. Compensating reservoir with a maximum capacity of 40 litres.

4. Pressure switch with an operating range of 0.05 to 2.5 bar.

5. Time delay switch.

6. Impulse counter.

7. Quick response valve, such as exhaust brake valve 60 mm in diameter, operated by a pneumatic cylinder with an output of 120 N at 4 bar. The response time, both when opening and closing, must not exceed 0.5 seconds.

8. Exhaust gas evacuation.

9. Flexible pipe.

10. Pressure gauge.